Training Report

Economic and Social Impact of African Swine Fever (ASF)

Report submitted by:
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Background

The Kingdom of Bhutan has experienced several outbreaks of African Swine Fever (ASF), which have had a detrimental impact on the country's pig farmers, resulting in significant economic losses. It is crucial to conduct an economic impact analysis of livestock diseases to make well-informed decisions and develop effective policies. By quantifying the economic losses associated with diseases, policymakers can make informed decisions on where to prioritize interventions and allocate resources efficiently. This analysis provides a robust basis for developing targeted strategies to mitigate economic losses and enhance the resilience of the livestock sector. Furthermore, it allows for a comprehensive cost-benefit analysis of different disease control measures, enabling the identification of the most cost-effective strategies. This guarantees that investments in animal health programmes are justified and well-directed, ultimately leading to improved resource management and more sustainable outcomes.

Consequently, a national consultant will conduct a training workshop for selected officials under the Department of Livestock, Ministry of Agriculture and Livestock on conducting socio-economic impact analysis of livestock diseases with a particular focus on ASF.

Why conduct an economic and social impact of ASF

This training is being conducted for two key reasons. Firstly, it is essential to gain an understanding of the impact of ASF across the entire pig value chain (see Figure 1). ASF inevitably causes significant economic losses and affects several stakeholders, including producers, consumers, and government entities. The three main issues contributing to this situation are:

1. ASF is a disease with high mortality rates.
2. The lack of effective vaccines, treatments and proper sanitary and hygiene practices makes eradication a significant challenge.
3. A large proportion of pigs are kept on small-sized farms which lack the capacity to prevent infection and to control pig diseases. To ascertain the financial impact on key stakeholders, an economic loss valuation is essential.

Secondly, the impact of animal disease is multifaceted and encompasses social and economic implications across the value chain (Figure 2). In low-income settings, this impact perpetuates poverty and reverses the progress made by those who have managed to escape it. While disease control can mitigate the negative consequences, it is essential to demonstrate the cost-benefit of investing in disease control to successfully secure investment. To conduct a quantitative assessment of ASF, it is essential to consider the cost-benefit equations involved in quantifying the impact of the disease.

Training objective

The training programme's primary objective is to provide veterinary and livestock officers with the skills and knowledge to conduct economic impact assessments of livestock diseases, with a particular focus on ASF. To achieve this objective, the module is structured into two broad categories, with an emphasis on both theoretical and practical aspects.

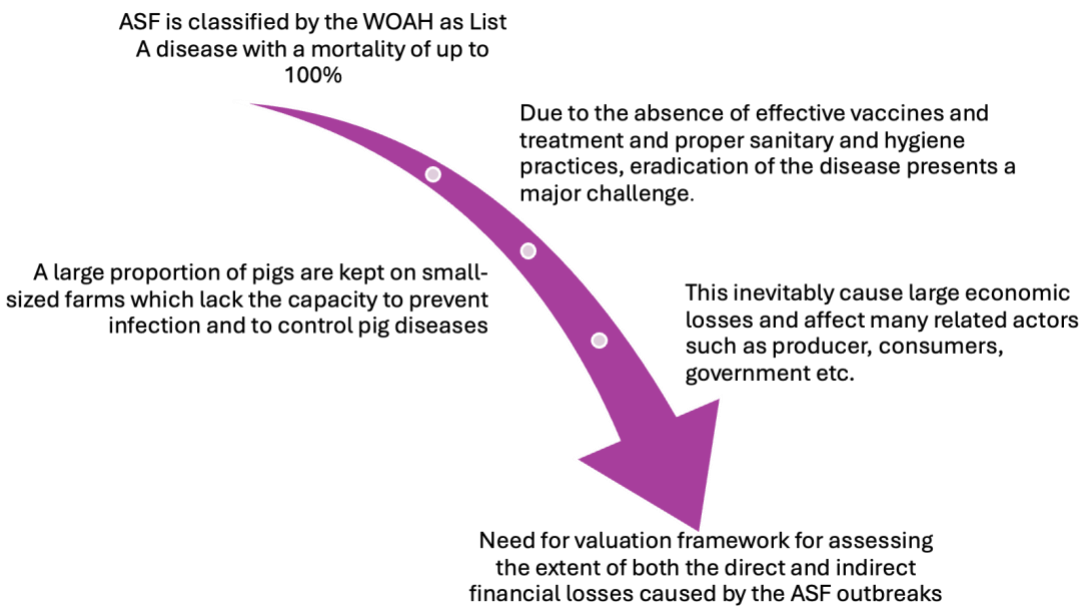

***Figure 1**. Motivation for Economic loss valuation of African Swine Fever (ASF)*

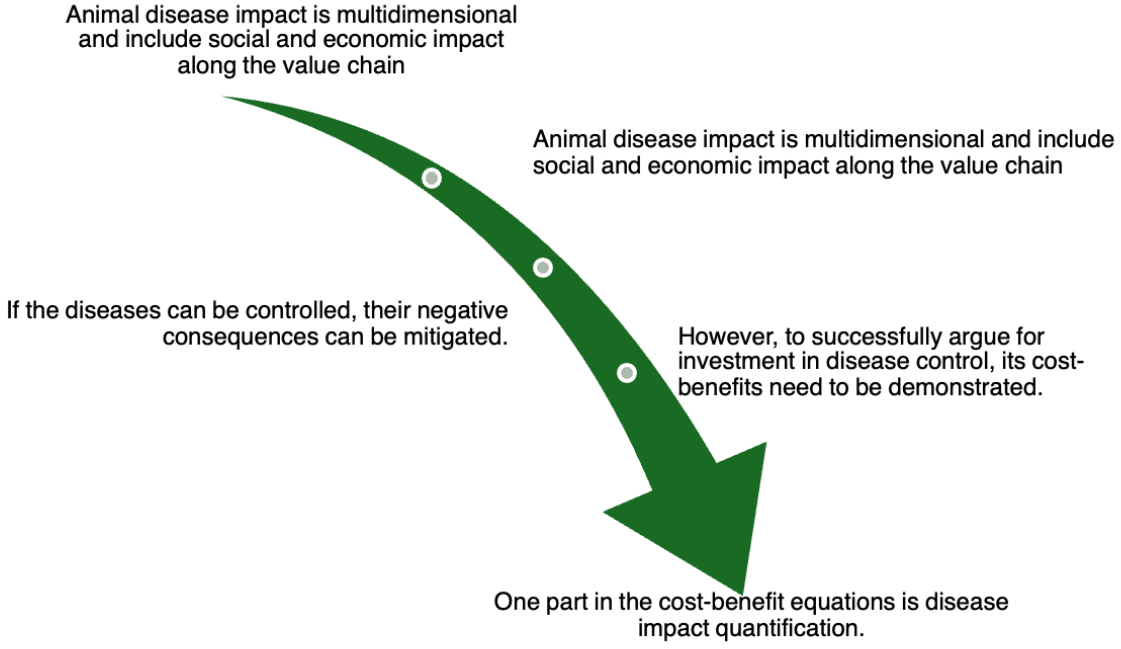

***Figure 2**. Motivation for Quantitative Assessment of African Swine Fever (ASF)*

Training content and method

Considering the background and motivations of the training discussed earlier, the training module has two main focuses, both grounded in theory and practical applications (Please refer to the Annexure for a detailed description of the module).

The initial module is dedicated to the assessment of economic losses resulting from ASF outbreaks. The economic loss valuation is designed to be carried out at the district or national level. Its objective is to calculate the loss to the producer (loss from dead and culled pigs; loss due to damaged reproductive capacity), the loss to the consumer (welfare loss from loss of consumer surplus), and the government losses (biosecurity measure expenditure, compensation, extension services, etc.). Participants will learn how to frame equations to calculate these losses and how to practically implement them using an Excel workbook.

The second module is dedicated to the quantitative assessment of the economic and social impact of ASF. A quantitative assessment is best designed to gather evidence at the household level. However, reports generated from households at the national level can be collectively used to understand the economy-wide impact of ASF. In the assessment, economic impacts include changes in pig value, change in herd size, and gross margin. Social impacts include pork consumption in the household, ASF impact comparison among households headed by male or female, and at different levels of education of the household heads. Participants are taught how to design interview instruments, implement them in the field, and how to analyze them using statistical software R. Following the training session, participants were given the opportunity to gain further insight into the use of R in the field.

Learning outcomes

At the end of the training, participants should be able to:

I. Understand theory of economic loss valuation from ASF,
II. Collect and analyze data on economic loss valuation,
III. Understand the framework for quantitative assessment including economic and social,
IV. Design quantitative assessment tools using simple statistical method using R,
V. Collect and analyze economic and social data for ASF impact in R,

VI. Report and communicate field work to policymakers.

Training experts and participants

The training module was developed and directed by Tshotsho (Agriculture Economist, national consultant), in collaboration with Dr. Thubten Sonam (Agriculture Economist, Professor), Dr. Penjore (Animal Science Expert, Associate Professor), and Tenzin Wangchuk (Agriculture Expert, R trainer). The experts are currently teaching at the College of Natural Resources in Punakha, where they bring a wealth of experience in teaching, research, and training. The participants were District Veterinary Officers and District Livestock Officers from various districts across Bhutan, as well as officers from NACH. A total of 25 participants attended the training, which was held over five days at the Namsey Choelling Resort in Paro.

Training deliveries, evaluations and recommendations

The training was well-received by all participants. Some participants expressed a preference for economic loss valuation, citing its straightforward methodology and ease of implementation. The participants were provided with the necessary materials, in the form of formulas and an Excel sheet, for the first two days of the course. By using hypothetical data, the participants were able to learn how to calculate economic loss to different actors in the pig industry, which helped them to understand the simplicity of this method. However, the participants were eager to participate in the training because it included an introduction to R and how to use it to study the impact of ASF. The R programming language was introduced to the participants only after the theories of statistics had been covered. The participants found the regression materials challenging, but they were generally positive about the training in R. Even some of the participants who had used R found some of the R packages interesting and helpful. However, the participants felt that the R training was insufficient in length. The training evaluation summary from the participants is presented in Figure 3 below. Based on this feedback, the following few recommendations have been made:

⇒ It would be beneficial for officers in the field to have the opportunity to engage in disease outbreak studies as part of their future advanced training in R.

⇒ While the participants are adequately trained in studying ASF outbreaks and their social and economic impacts, the question of when and how successfully the knowledge gained will be utilized remains challenging. It may therefore be necessary for FAO and NACH to provide support in this area.

⇒ The selection of participants was appropriate, but if future training modalities could be modified to allow experts and participants to spend time after training sessions encouraging further discussion and collaboration. It would be beneficial to make them live in the training area for the entire duration of the training course.

⇒ It is difficult to implement the knowledge gained during training due to the lack of opportunity to do so. Immediate application of the tools learned would enhance the effectiveness of the training. It would be beneficial to provide follow-up field-based assistance to the participants by an expert, given the importance of the training and the impact of the ASF outbreak in Bhutan.

⇒ It would be beneficial to allocate additional training days to learn about the implementation of the tools learned in the field. Training could be conducted in close proximity to locations experiencing ASF or other animal disease outbreaks, incorporating some field-based learning.

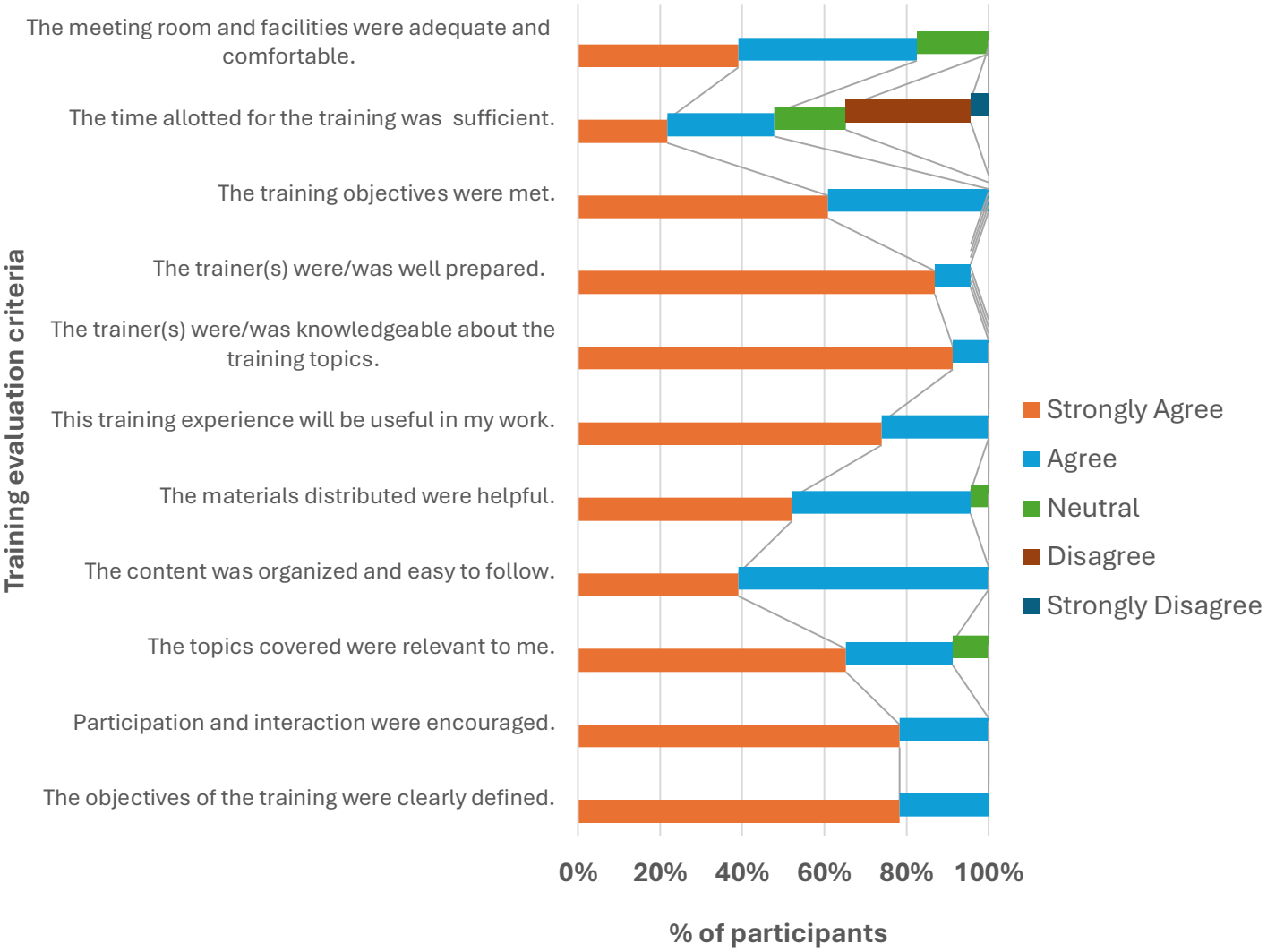

***Figure 3**. Training evaluation and feedback*

Annexure A

Training on assessing the Socio-Economic Impact of ASF outbreak

Module description

The main objective of the training program is to equip veterinary and livestock officers with the skills and knowledge to conduct economic impact assessments of livestock diseases with particular emphasis on ASF. To achieve this objective the module is structured into two broad categories with emphasis on both theory and practical.

Learning outcomes

At the end of the training, participants should be able to:

VII. Understand theory of economic loss valuation from ASF,
VIII. Collect and analyze data on economic loss valuation,
IX. Understand the framework for quantitative assessment including economic and social,
X. Design quantitative assessment tools using simple statistical method,
XI. Collect and analyze economic and social data for ASF impacts,
XII. Report and communicate field work to policymakers.

Module structure

Module 1A: Theory on Economic loss valuation system for ASF

I. Economic loss from removal of swine
II. Economic loss from damaged reproductive capacity
III. Economic loss from farm abandonment
IV. Economic loss from change in consumer surplus
V. Economic loss from loss to the government

Module 1B: Practical on loss valuation for ASF

I. Economic loss from removal of swine
II. Economic loss from damaged reproductive capacity
III. Economic loss from farm abandonment
IV. Economic loss from change in consumer surplus
V. Economic loss from loss to the government

Module 2A: Quantitative Assessment of Economic and Social Impact of ASF

I. Multi-dimensional impact (economic and social) of ASF along the pork value chain (includes gross margin, herd size, household meat consumption, social gatherings)
II. Designing impact Study I – Longitudinal method
III. Designing impact Study II – Participant selection
IV. Designing impact Study III – Data collection
V. Designing impact Study IV – Data types and input
VI. Designing impact Study V – Describing the data
VII. Designing impact Study VI – Learning about association between ASF and outcomes through regression models
VIII. Designing impact Study VII A – Interpreting regression outputs
IX. Designing impact Study VII B– Interpreting regression outputs
X. Designing impact Study VIII: Reporting and communication

Module 2A: Practical session on Quantitative Assessment of Economic and Social Impact of ASF using R platform

I. Introduction to R platform
II. Importing filed data to R
III. Describing the data using R
IV. Analyzing the data using regression in R
V. Generating outputs (figures and tables) using R

Materials required: Laptop with R installed, and Microsoft excel

Training delivered by: Penjore (PhD), Thubten Sonam (PhD), Tshotsho (PhD) and Tenzin Wangchuk (MSc.)

Annexure B

Training Agenda

Training on Assessing the Socio-Economic Impact of ASF outbreak

Organized and funded by FAO-Bhutan

1-5 August 2024
Venue: Namsey Choelling, Paro

Time	Topic	Facilitator
	Registration and Introduction	
08:30 – 09:00	Registration of participants	
09:00 – 09:30	Introduction of participants and familiarization of the training	TT
09:30 – 10:00	Tea Break	
Day 1 (1.8.2024): Economic loss valuation system for ASF (Theory)		
10:00 – 12:20	Setting the context for ASF study	Dr. Penjore
12:20 – 12:35	Why conduct economic loss valuation and Impact Assessment	TT
13:00 – 14:00	Lunch Break	
14:00 – 16:00	Economic loss valuation	Dr. TS
16:00 – 16:30	Tea Break & training evaluation discussion	Group
Day 2 (2.8.2024): Economic loss valuation system (Practical in Excel)		
09:00 – 10:11	Economic loss valuation exercise	Dr. TS/TT
11:00 – 11:30	Tea Break	
11:30 – 13:00	Economic loss valuation and sensitivity analysis	TT & Dr. TS
13:00 – 14:00	Lunch Break	
14:00 – 16:00	Quantitative Assessment – Designing the study	Dr. Penjore
16:00 – 16:30	Tea Break & training evaluation	Group
Day 3 (3.8.2024): Quantitative Assessment of Economic and Social Impact of ASF (Theory)		
09:00 – 11:00	Importing data into excel	Dr. Penjore/TT/ Dr. TS
11:00 – 11:30	Tea Break	
11:30 – 13:00	Regression Model – Theory	TT
13:00 – 14:00	Lunch Break	
14:00 – 16:00	Regression model – Examples and intrepretation	TT
16:00 – 16:30	Tea Break & training evaluation	Group

Day 4 (4.8.2024): Quantitative Assessment of Economic and Social Impact of ASF (Practical)		
09:00 – 11:00	Introduction to R Platform-Getting started with R	TW
11:00 – 1:00	Tea Break	TW & TT
11:30 – 13:00	Data management with Tidyverse	
13:00 – 14:00	Lunch Break	
14:00 – 16:00	Data visualization with GGPLOT2	TW & TT
16:00 – 16:30	Tea Break & training evaluation	Group
Day 5 (5.8.2024): Quantitative Assessment of Economic and Social Impact of ASF (Practical)		
09:00 – 11:00	Data visualization with GGPLOT2	TW
11:00 – 11:30	Tea Break	
11:30 – 13:00	Data summary with gtsummary	TT
13:00 – 14:00	Lunch Break	
14:00 – 15:30	Regression, stargazing and checking OLS assumptions with lessR	TT TT
15:30 – 16:00	Training conclusion, evaluation and way forward	
End of training		
*** Dr. TS: Dr. Thukten Sonam, TT: Tshotsho, Dr. P: Dr. Penjor, TW: Tenzin Wangchuk		